



National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material[®] 723d

2-Amino-2-(hydroxymethyl)-1,3-propanediol

[tris(Hydroxymethyl)aminomethane]

(HOCH₂)₃CNH₂
Acidimetric Standard

This Standard Reference Material (SRM) consists of highly purified 2-amino-2-(hydroxymethyl)-1,3-propanediol [tris-(hydroxymethyl)aminomethane; “THAM”; “Tris”], hereafter referred to as Tris. SRM 723d is intended for use in acidimetric standardization and is supplied in a unit of 50 g.

Certified Value: The certified value, reported in Table 1 as a mass fraction, is based on coulometric assays of dried material (see *Drying Instructions*), including the effects of air buoyancy. The certified value is based on the results of duplicate determinations from each of 10 randomly selected bottles from the entire lot of SRM 723d. Each determination was obtained by coulometric acidimetric back-titration [1] of the given Tris sample to the inflection point (pH ca. 4.8) after addition of excess coulometrically-standardized HCl.

Table 1. Certified Value (Mass Fraction) for Tris, Acidimetric Assay

Tris 99.924 % ± 0.036 %

The uncertainty is an expanded uncertainty, U , calculated as $U = ku_c$, where k is a coverage factor that governs the confidence level of U and u_c is the combined standard uncertainty calculated according to the ISO Guide [2]. The quantity u_c represents, at the level of one standard deviation, the potential combined effects of the uncertainty arising from instrumental sources, chemical interferences, and uncertainties in fundamental constants, combined with the statistically-evaluated prediction interval for a unit of the SRM. The value $k = 2.262$ was used to obtain the cited value for U , representing an approximate 95 % level of confidence.

The certified value was obtained using the current value for the Faraday constant, 96 485.341 5 °C^g mol⁻¹ [3]; and molar mass of Tris, 121.135 04 g^g mol⁻¹ (calculated from [4]). Corrections for air buoyancy were made using 1.35 g^g cm⁻³ for the density of Tris [5].

Expiration of Certification: The certification of this SRM is valid until **01 March 2009**, within the uncertainty specified, provided the SRM is handled and stored in accordance with the instructions given in this certificate (see *Instructions for Use*). However, the certification will be nullified if the SRM is damaged, contaminated, or otherwise modified.

Coulometric analyses were performed in the NIST Analytical Chemistry Division by K.W. Pratt.

Statistical consultation for this SRM was provided by H.-k. Liu of the NIST Statistical Engineering Division

The technical and support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the NIST Standard Reference Materials Program by J.C. Colbert and B.S. MacDonald.

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INSTRUCTIONS FOR USE

Use of SRM: This SRM is certified for acidimetric assay **ONLY** and is not intended for use in pH standardizations.

Stability and Storage: This SRM should be stored in its original bottle at room temperature. It must be tightly re-capped after use and protected from moisture and light.

Drying Instructions: Dry at room temperature at 22 °C to 23 °C for 24 h in a vacuum desiccator over anhydrous magnesium perchlorate or equivalent. Drying of this material at elevated temperatures is not recommended due to the possibility of decomposition and/or loss of occluded water.

Homogeneity: Tests indicate that this SRM is homogeneous within the uncertainty limits for sample sizes greater than 500 mg. Samples less than 500 mg are not recommended in order to avoid possible inhomogeneity with smaller sample sizes.

Source of Material: The Tris used for this SRM was obtained from a commercial source. The material was examined for compliance with the specification for reagent grade Tris as specified by the American Chemical Society [6]. The material was found to meet or exceed these specifications in all respects.

REFERENCES

- [1] Pratt, K.W.; *Anal. Chim. Acta*; 1994, Vol. 289, p. 135.
- [2] *Guide to the Expression of Uncertainty in Measurement*; ISBN 92-67-10188-9, 1st Ed., ISO, Switzerland (1993).
- [3] Mohr, P.J.; Taylor, B.N.; *Journal of Physical and Chemical Reference Data*; 1999, Vol. 28 (6), pp. 1713-1852; *Reviews of Modern Physics*; 2000, Vol. 72 (2), pp. 351-495; http://physics.nist.gov/cgi-bin/cuu/Value?f|search_for=faraday.
- [4] Commission of Atomic Weights and Isotopic Abundances; *Pure & Appl. Chem.*; Vol. 73 (4), pp. 667-683 (2001).
- [5] *Certificate for SRM 723a*; National Bureau of Standards (April 20, 1981).
- [6] *Reagent Chemicals*; 8th Ed.; American Chemical Society, Washington, DC (1993).

Users of this SRM should ensure that the certificate in their possession is current. This can be accomplished by contacting the SRM Program at: telephone (301) 975-6776; fax (301) 926-4751; e-mail srminfo@nist.gov; or via the Internet <http://www.nist.gov/srm>.